

## CLAIMS

1. A method of performing an atomic force microscopy (AFM) measurement, using an AFM microscope equipped with a probe, the method comprising:

defining a force profile, which is a force change as a function of time, wherein the minimum force is larger than zero; and

performing the AFM measurement on a sample, by scanning at least one line over the sample, wherein a force being exerted on the sample by the AFM probe is changed according to the force profile, during the movement of the probe in one direction along the line.

2. The method according to claim 1, further comprising defining a speed profile, which is a speed change of the probe as a function of time, and wherein a speed of the probe during the movement along the line changes according to the speed profile.

3. The method according to claim 2, wherein the force profile comprises a periodic block wave, each cycle of the block wave consisting of an interval wherein the force is constant at a first level, followed by an interval wherein the force is constant at a second level, and wherein the first level is higher than the second level.

4. The method according to claim 3, wherein the speed profile comprises a periodic block wave, wherein the speed has a first finite and constant value during the interval of the second level, and wherein the speed is zero during the interval of the first level.

5. The method according to claim 3, wherein the speed profile has a second constant and finite value.

6. The method according to claim 3, wherein at least one electrical measurement is performed during the interval

of the first level, and wherein at least one topographical measurement is performed during the interval of the second level.

7. The method according to claim 1, wherein electrical data as well as topographical data are gathered during one movement of the probe along one line.

8. An apparatus for performing an atomic force microscopy measurement, comprising :

an atomic force microscope (AFM);

an amplifier;

an input/output device; and

a controller device;

wherein the input/output device is configured to receive at least one of a force profile and a speed profile, and to transfer the at least one of the profiles to the controller device;

and wherein the controller device is configured to transmit the at least one of the profiles to the AFM;

and wherein the apparatus is configured to perform a multiplexing/demultiplexing operation on measurement signals coming from the AFM;

and wherein the amplifier amplifies the measured signals before performing the multiplexing/demultiplexing operation and transmitting the measured signals to the controller device.

9. The apparatus of Claim 8, wherein the amplifier comprises a logarithmic amplifier.

10. An apparatus for performing an atomic force microscopy measurement, comprising :

an atomic force microscope (AFM) having a probe with a tip, the AFM configured to perform an atomic force microscopy measurement on a sample; and

a controller configured to receive a force profile which is a force change as a function of time, and to control the AFM such that a force being exerted on the sample by the probe tip is changed based on the force profile during scan of at least one line on the sample.

11. The apparatus of Claim 10, wherein the force profile comprises a periodic block wave, each cycle of the block wave consisting of an interval wherein the force is constant at a first level, followed by an interval wherein the force is constant at a second level, and wherein the first level is higher than the second level.

12. The apparatus of Claim 11, wherein the controller is configured to receive a speed profile which is a speed change as a function of time, and to control the AFM such that a movement speed of the probe is changed based on the speed profile during scan of at least one straight line on the sample.

13. The apparatus of Claim 12, wherein the speed profile comprises a periodic block wave, wherein the speed has a first finite and constant value during the interval of the second level, and wherein the speed is zero during the interval of the first level.

14. The apparatus of Claim 12, wherein the speed profile has a second constant and finite value.

15. The apparatus of Claim 10, further comprising an amplifier and an input/output device; and wherein the apparatus is configured to perform a multiplexing/demultiplexing operation on measurement signals coming from the AFM, and wherein the amplifier amplifies the measured signals and transmits the measured signals to the controller.

16. The apparatus of Claim 10, wherein the minimum value of the force being exerted on the sample by the probe tip is larger than zero.

17. A method of performing an atomic force microscopy measurement, comprising:

providing an atomic force microscope (AFM) including a probe with a tip;

defining a force profile, which is a force change as a function of time;

scanning at least one line over a sample using the probe tip; and

changing a force being exerted on the sample by the probe tip based on the force profile during the scanning.

18. The method of Claim 17, wherein the force profile comprises a periodic block wave, each cycle of the block wave consisting of an interval wherein the force is constant at a first level, followed by an interval wherein the force is constant at a second level, and wherein the first level is higher than the second level.

19. The method of Claim 18, further comprising defining a speed profile, which is a speed change of the probe as a function of time and changing a movement speed of the probe based on the speed profile.

20. The method of Claim 19, wherein the speed profile comprises a periodic block wave, wherein the speed has a first finite and constant value during the interval of the second level, and wherein the speed is zero during the interval of the first level.

21. The method of Claim 19, wherein the speed profile has a second constant and finite value.

22. The method of Claim 17, wherein the minimum value of the force being exerted on the sample by the probe tip is larger than zero.

23. An apparatus for performing an atomic force microscopy (AFM) measurement, using an AFM microscope equipped with a probe, the apparatus comprising:

means for defining a force profile, which is a force change as a function of time, wherein the minimum force is larger than zero; and

means for performing the AFM measurement on a sample, by scanning at least one line over the sample, wherein a force being exerted on the sample by the AFM probe is changed according to the force profile, during the movement of the probe in one direction along the line.

24. An apparatus for performing an atomic force microscopy measurement, comprising:

means for providing an atomic force microscope (AFM) including a probe with a tip;

means for defining a force profile, which is a force change as a function of time;

means for scanning at least one line over a sample using the prove tip; and

means for changing a force being exerted on the sample by the probe tip based on the force profile during the scanning.